

ANNUAL REPORT
OF
THE IMPERIAL BACTERIOLOGIST
FOR THE YEAR 1912-13

Muktesar Laboratories

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FOR THE YEAR 1912-13*

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Annual Report of the Imperial Bacteriologist

For the year 1912-13.

ADMINISTRATION.

I remained in charge of the Laboratory throughout the year. From 1st October 1912 to 30th March 1913 my services were placed at the disposal of the Commission sent from England to investigate certain questions connected with Foot and Mouth disease. Much of my time between these dates was occupied in this work.

2. The charge of the office of the Assistant Bacteriologist was held by Mr. Cross from 1st April to 11th of June 1912. He was absent on six months' leave out of India and rejoined his work on the 11th December 1912.

During the interval I carried out his duties in addition to my own. By the middle of January Mr. Cross was transferred to Sohawa as Camel Specialist, and Mr. Meadows acted as Assistant Bacteriologist from 14th January 1913.

3. Dr. Hartley held the appointment of Physiological Chemist till 18th of February 1913, when he resigned. Since that time the post has been vacant.

4. During the year under report Mr. Kriebel, the Head Laboratory Assistant, was absent on leave, and the new Assistant, Mr. Mobbs, worked in the Laboratory as his substitute.

Messrs. Keiller and Goffi, the second and third Laboratory Assistants, remained in their respective appointments.

5. *Fodder Supply*.—The arrangements for grain and grass were satisfactory. A small amount of fodder was obtained from the Laboratory area. The larger amount was collected from the surrounding forests from distances of 4 to 10 miles.

6. *Forests*.—The demand for fuel was met from the Laboratory reserved forest.

There were no illicit fellings nor forest fires within the Reserve. Many of the blank areas are being re-forested by natural process.

The nursery at Ritani was maintained and several thousand young deodar trees planted out.

7. *Supply of Hill Bulls*.—Both from Kumaun and Garhwal a number of hill bulls were received in small batches sufficient for our requirements.

Buffaloes are being extensively used in place of hill bulls. A large supply of these animals is obtainable from the districts round Bareilly.

8. *Bareilly Branch Laboratory*.—This Laboratory remained open during the winter months. In addition to the routine work, experiments were carried out on Foot and Mouth disease by the Commission deputed from England.

As for some years past it has been experienced that the present Laboratory area is too confined for research work and for serum preparation, the Government of India approve

of a proposal to remove the Laboratory to another site. A more extensive location has been selected about 5 miles to the north of Bareilly and a scheme for the erection of necessary buildings submitted to the Government of India.

PREPARATION OF SERUMS AND VACCINES.

9. *Rinderpest Anti-Serum*.—During the year under report 8,05,500 doses of Anti-Rinderpest serum were prepared against 10,52,500 doses in the preceding year, while the amount issued during the year exceeded the issue of the previous year by 4,30,400 doses, being 11,28,500 against 6,98,100 in the year 1911-12.

The Egyptian Government, after experimenting with the serum prepared at this Laboratory on their highly susceptible cattle, requested to be supplied with 50,000 doses at 100 c.c. or 10 lacs doses at 5 c. c.

This demand we were unable to comply with in full, but agreed to supply three lacs doses at 5 c. c. in instalments.

The above issue of 11,28,500 doses includes 198,730 doses at 5 c. c. to the Egyptian Government.

It is satisfactory to note that although a charge of two annas per dose of 5 c. c. has been imposed on this serum, the demands from the provincial Governments (with the exception of the Punjab) have been greater than in previous years.

The sum realized from the sale of this serum amounted to Rs. 1,09,338 as compared with Rs. 72,277 during the year 1911-12.

10. The figures in the subjoined table, as collated from the respective returns received, will show the results of Anti-Rinderpest serum injections carried out in the field.

REPORT OF THE IMPERIAL BACTERIOLOGIST

Province.	Number of outbreaks in which inoculation was undertaken.	NUMBER OF ANIMALS WHICH DIED UNINOCULATED IN COURSE OF DISEASE.			NUMBER OF ANIMALS INOCULATED.			NUMBER OF ANIMALS WHICH DIED AFTER INOCULATION.			REMARKS.
		Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	
Punjab . . .	197	...	3,651	...	18,341	...	...	67	...		
North-West Frontier Province and North Punjab.	71	...	525	...	16,266	...	...	12	...		
United Provinces .	741	...	5,705	7	49,162	102	...	34	...		
Bengal . . .	146	...	2,056	...	18,095	28	...	43	...		
Assam . . .	235	...	8,403	...	27,347	14	...	862	...		
Bihar and Orissa .	66	...	532	...	8,535	...	...	61	...		
Central Provinces	1,514	...	13,269	...	1,87,113	...	...	91	...		
Bombay . . .	111	...	1,455	...	19,875	31	...	102	...		
Madras . . .	123	...	2,151	644	36,903	1,449	...	21	...		
Sind, Baluchistan and Rajputana.	11	...	1,034	25	2,602	49	...	2	1		
Burma . . .	44	...	2,061	...	11,927	...	...	128	...		
Mysore State . .	...	...	...	...	434	...	...	...	...
Daroda State . .	...	...	...	...	200	...	...	...	...
Bengal Veterinary College.	46	...	70	...	1,698	...	...	84	...		
TOTAL .	8,305	...	40,060	676	3,06,478	1,763	...	1,457	2		

11. *Anthrax Anti-Serum*.—During the year 1912-13 2,658 doses of this serum were prepared, and 6,718 issued, against 28,722 prepared and 6,070 issued during the year 1911-12.

12. The following is a statement of the results obtained in the field from inoculations with Anthrax serum.

Province.	Number of outbreaks in which inoculation was undertaken.	NUMBER OF ANIMALS WHICH DIED UNINOCULATED IN COURSE OF DISEASE.			NUMBER OF ANIMALS INOCULATED.			NUMBER OF ANIMALS WHICH DIED AFTER INOCULATION.			REMARKS.
		Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	
Bengal . . .	8	6	6	...	101	185	...	1	...	...
Assam . . .	20	3	158	1	225	1,708	...	...	36	...	
Bihar and Orissa . .	1	...	80	...	...	56	...	...	..	...
Bombay . . .	2	...	10	...	...	669	...	...	1	...	
Native States . .	...	...	...	...	...	205	...	...	...	...
TOTAL . . .	26	9	254	1	326	2,823	...	1	37	...	

13. *Hæmorrhagic Septicæmia*.—During the year under report 40,901 doses Hæmorrhagic Septicæmia serum were prepared and 43,218 doses issued as compared with 30,845 prepared and 28,970 issued during the previous year.

The excess in issue was met partly from the previous year's surplus and partly from the quantity returned from the field as unused.

In addition to the Hæmorrhagic Septicæmia serum 25,750 doses of Hæmorrhagic Septicæmia Vaccine were also prepared and issued during the year under report.

14. The results of inoculations in the field of the Hæmorrhagic Septicæmia serum and vaccine are given in the following table:—

Province.	Number of outbreaks in which inoculation was undertaken.	NUMBER OF ANIMALS WHICH DIED UNINOCULATED IN COURSE OF DISEASE.			NUMBER OF ANIMALS INOCULATED.			NUMBER OF ANIMALS WHICH DIED AFTER INOCULATION.			REMARKS.
		Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	
Punjab . . .	36	...	140	...	...	2,375	...	...	...	...
North-West Frontier Province.	9	...	...	...	...	731	...	...	...	...
United Provinces	140	...	753	...	...	12,667	...	...	6	...	
Bengal . . .	23	...	340	...	...	2,407	...	...	3	...	
Assam . . .	12	...	53	5	...	1,130	15	...	...	...
Bihar and Orissa .	132	...	625	...	...	12,967	...	...	6	...	
Central Provinces .	3	...	...	...	...	93	...	...	...	...
Sind, Baluchistan, and Rajputana.	...	...	...	...	...	98	...	...	...	...
TOTAL . . .	355	...	1,914	5	...	32,463	15	...	15	...	

15. *Charbon Symptomatique Vaccine*.—Out of the last year's surplus of 58,150 doses, 10,800 were issued during the year.

16. The subjoined table will show the results of Charbon Symptomatique vaccine injections carried out in the field during 1912-13 :—

Province.	Number of outbreaks in which inoculation was undertaken	NUMBER OF ANIMALS WHICH DIED UNINOCULATED IN COURSE OF DISEASE			NUMBER OF ANIMALS WHICH DIED AFTER INOCULATION.			REMARKS.		
		Equines.	Bovines.	Others.	Equines.	Bovines.	Others.			
Punjab	9	...	...	...	...	381	...	...	...	...
North-West Frontier Province.	31	...	...	...	...	2,700	...	...	3	...
United Provinces	12	...	96	...	...	1,485	...	...	...	...
Bihar	14	...	68	...	...	1,118	...	...	11	...
Mysore State . . . . .	...	...	...	...	...	3,307	...	...	1	...
TOTAL	66	...	164	...	...	8,086	...	...	15	...

17. *Mallein*.—During the year 1912-13, 15,181 doses of Mallein were prepared and 17,933 issued as against 20,664 prepared and 16,480 issued during the year 1911-12.

The excess issue was met from the previous year's surplus of 4,224 doses.

18. *Tuberculin*.—During the year under report 530 doses of Tuberculin were prepared and 162 issued as compared with 519 prepared and 577 issued in the preceding year.

19. *Strangles*.—2,470 doses of this serum were prepared and 2,320 issued during the year as against 1,294 prepared and 2,298 issued during the previous year.

All of this was issued to the Remount Department, and results are reported to be very satisfactory.

During February 1913 I visited the Remount Depôts at Sargodha and Mona and had an opportunity of seeing young

stock suffering from strangles under treatment with serum. The Veterinary officers in charge informed me that they had very good results using the serum as a curative agent in pronounced cases of strangles.

20. *Specimens examined*.—During the year under report 123 specimens of different diseases were received for examination and report at the Laboratory. The results were communicated to the persons interested.

21. *Training of Veterinary Assistants*.—At the Bareilly Branch Laboratory 8 Veterinary Assistants received training in the methods of inoculation with serum alone, against 18 during the year 1911-12.

With a view to check the spread of Rinderpest among the milch and draft cattle of Military Dairy Farms, a scheme has been approved of by the Quarter-Master-General in India to train Dairy Managers in inoculation work at this Laboratory.

Captain J. A. B. McGowan, A.V.C., of Umballa, studied at the Laboratory for $2\frac{1}{2}$ months from 16th July to the end of September 1912.

RESEARCH WORK.

22. *Research*.—The programme of the Research work for the year under report was as follows :—

- (1) *Rinderpest*.—Further experiments regarding the most economical methods of preparing this serum with special reference to Plains Cattle and Buffaloes.
- (2) *Surra*.—To continue experiments in methods of treatment. Investigations regarding transmission.
- (3) *Anthrax*.—To continue investigations of methods of immunising against this disease.
- (4) *Hæmorrhagic Septicæmia*.—Investigations regarding the vitality of the organism outside the body and on methods of transmission.

(5) *Foot and Mouth Disease*.—Investigation regarding the etiology and methods of protection whenever material is available.

23. *Rinderpest*.—Several series of experiments were carried out in questions connected with Rinderpest serum preparation. The results are being summarised for publication in Memoir form.

Many other experiments were made on the value of drug treatment in Rinderpest. This investigation is being continued.

24. *Surra*.—Further experiments were conducted on the treatment and transmission of Surra.

25. The following extracts from the Annual Report of the Bacteriological Laboratory in the Colony of Mauritius for the year 1911 show the results of treatment of Bovidæ and Equidæ in that Colony :—

“Treatment of Bovidæ and Equidæ by Arsenious acid and Soamin according to the method of Captain J. D. E. Holmes, M.A., D.Sc., Imperial Bacteriologist to the Government of India. The high percentage of cures (75 per cent.) obtained in India on Surra infected horses by Captain Holmes induced us to try his method of treatment on affected Bovidæ and Equidæ in Mauritius.

“The results obtained on Bovidæ proved excellent. A total of 158 cases were treated, 29 by ourselves and 129 by Messrs. Bradshaw, Veterinary Surgeons, to whom we had indicated the method we had employed. No death was recorded, while before the treatment was started the mortality on the herds dealt with had, during the three preceding weeks, been as follows :—

Herd No. 1	35 heads	6 deaths
“ No. 2	74 „	9 „
“ No. 3	61 „	6 „
“ No. 4	41 „	2 „

"The method of treatment adopted was the following:— One subcutaneous injection of Soamin, following by the administration of 10 doses of Arsenious acid in bolus on alternate days.

"On Equidæ we did not obtain results as good as those of Captain Holmes, but nevertheless they are certainly encouraging and show that Arsenic against Surra is really a specific on condition that subtoxic doses be given while the Arsenic is not pushed so far as to cause colic, loss of appetite, and other symptoms of poisoning.

"To secure this desideratum it is necessary to estimate the dose in each case separately, owing to idiosyncrasy which exists also among animals.

"Twenty Equidæ were admitted for treatment in 1911. Of them, it is but fair that Nos. 6, 10 and 16 be left out as the animals came in a dying condition, unfit to stand the treatment.

"Out of the remaining 17 animals, 9 were cured (52·9 per cent.), 6 of them have been working regularly and efficiently for 10, 8 and 4 months, while the others are given slowly progressive work.

"It is, therefore, impossible not to appreciate, or even to question, the curative value of Captain Holmes' Arsenical treatment of Surra, which has, in addition, the advantage of being simple and economical.

"We are glad to be able to record here our thanks to Captain Holmes for his advice whilst we were engaged on this work."

During the year under report the Divisional Veterinary Officer, Burma Division, Maymyo, obtained the results noted below on Surra treatment in Upper Burma:—

"About 100 mules have been treated by Holmes' method; 60 of these, at time of writing, have finished the course of treatment, and are apparently all right, as they have no fever and no trypanosomes in their peripheral blood.

"The remainder are still under treatment. One mule was treated with an intravenous injection of a double dose of '606' followed by the course of arsenic as laid down by Holmes and has never had a temperature since 20th September 1912. No other treatment besides these was adopted."

26. *Anthrax*.—An investigation was made on the value of the simultaneous inoculations of an Anthrax vaccine and Anti-Anthrax serum, as compared with the inoculation of an unmodified virus and anti-Anthrax serum. A paper on this subject is being prepared for publication.

27. *Hæmorrhagic Septicæmia*.—The investigation regarding the vitality of the organism outside the body was continued and is not yet completed. Some experiments were made in the drug treatment of this disease.

28. *Bursati*.—A study of the etiology and histology of this disease was engaged in, and a paper on the conclusions is now ready for publication.

29. *Publications*.—The following Scientific articles from the Laboratory were submitted for publication during the year and appeared in a Veterinary series of Memoirs of the Department of Agriculture:—

- (1) Anaphylaxis in the larger animals. By J. D. E. Holmes.
- (2) Salvarsan in the treatment of Surra in horses, dogs and rabbits. By J. D. E. Holmes.
- (3) A Note on some Interesting Results following the internal administration of Arsenic in Canker and other diseases of foot in horses. By J. D. E. Holmes.
- (4) Contribution to our knowledge of the immune bodies occurring in anti-Rinderpest serum and of the variation occurring in the serum protection of animals during Rinderpest and during immunisation and hyper-immunisation. By P. Hartley.

- (5) A description of the Imperial Bacteriological Laboratory, Muktesar, its work and products. By J. D. E. Holmes.

30. Also Memoir No. 3 of the Civil Veterinary Department appeared during the year. It contained the following articles:—

Surra—

- (1) The treatment of Surra in Horses by means of Arsenic and its Derivatives. By J. D. E. Holmes.
- (2) The Cure of Surra in Horses by the Administration of Arsenic. By J. D. E. Holmes.
- (3) A Further Note on the Cure of Surra in Horses. By J. D. E. Holmes.
- (4) Some Experiments in the Treatment of Surra in Camels. By J. D. E. Holmes.

Rinderpest—

- (1) Reports on Experiments carried out to test the susceptibility of Cattle for several districts and on Improved methods of Rinderpest Serum preparation. By J. D. E. Holmes.
- (2) The Preparation of Anti-Rinderpest Serum by the Injection of Virulent Artificial Peritoneal Fluid by H. E. Cross, Assistant Bacteriologist.
- (3) On the Immune Bodies occurring in Rinderpest Immune Serum, Part I. The Preparation of the Rinderpest Immune Bodies by Dialysis of the Immune Serum. By P. Hartley, Physiological Chemist.
- (4) Report on the Preparation of Rinderpest anti-Serum by means of Diluted Virulent Fluids. By P. Hartley, Physiological Chemist.

Hæmorrhagic Septicæmia—

Further Testings of the Hæmorrhagic Septicæmia anti-Serum and Vaccine on Bovines and Equines. By J. D. E. Holmes.

Anthrax—

The Practical Value of Anthrax anti-Serum and Vaccines, Preliminary Report. By J. D. E. Holmes.

Miscellaneous—

A Note on Elements resembling Spirochaetes found in the Blood of Man and Animals. By J. D. E. Holmes.

31. *Remarks.*—The Assistant Bacteriologist was on leave for six months from the 11th June 1912. The Head Laboratory Assistant was on leave throughout the year, the Senior Veterinary Inspector was on leave from 17th June to 10th September 1912. From October to March the time of the Imperial Bacteriologist was largely taken up in connection with the Foot and Mouth Commission.

The Physiological Chemist resigned on 18th February 1913. The Farm Manager resigned on the 31st July 1912, and the post remained vacant.

The Electrician resigned on the 13th November 1912, and the post was vacant up to the 1st December 1912.

In consequence of the above changes the difficulties of administration were many and the work demanded of the staff extremely heavy. The fact that the full work of the Laboratory was maintained is a testimony to the zeal and energy of all the staff. The amount of serums and vaccines issued was in excess of previous year. Advance was made in research work and interesting scientific articles published.

**Table showing the doses of different products issued
from the Muktesar Laboratory during the year
1912-13.**

Table showing the doses of different products issued from

Name of sera.	SERAS.								
	Punjab.	North-West Frontier Province and North Punjab.	South Punjab.	United Provinces.	Bengal.	Assam.	Behar and Orissa.	Central Provinces.	Bombay.
Rinderpest serum	39,800	23,000	15,000	1,29,150	41,020	73,150	14,000	3,08,000	16,000
Anthrax serum	...	...	...	...	900	5,000	600	...	...
Hæmorrhagic Septicæmia Serum.	1,800	...	300	16,075	5,875	2,000	13,000	3,000	...
Hæmorrhagic Septicæmia Vaccine.	200	2,350	...	1,500	1,000	...	13,000	7,000	...
Charbon Symptomatique Vaccine.	800	3,100	300	...	...	...	3,600	...	...
Mallein	133	20	95	130	200	220	...	100	35
Tuberculin	8	...	60	...	50	...	...	...	...
Anti-Streptococcus Serum.	10	...	...	...	...	...	...	...	...
Bursall Serum	...	...	...	...	...	...	...	...	...
TOTAL DOSES	42,751	28,470	15,755	1,40,855	49,045	85,370	44,100	3,18,100	16,035

FOR THE YEAR 1912-13.

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the Muktesar Laboratory during the year 1912-13.

ISSUED.									
Madras.	Coorg.	Sind, Baluchistan and Rajputana.	Burma.	Military Department.	Native States.	Indian Firms.	Foreign Countries.	Imperial Bacteriological Laboratory.	TOTAL.
1,00,300	1,000	5,200	33,000	69,115	25,980	200	2,31,939	7,071	11,26,870
...	08	...	...	...	152	6,718
...	350	...	...	...	819	43,216
500	...	200	...	...	...	...	...	...	26,727
...	3,000	...	...	100	10,433
...	2,350	11,050	421	400	1,850	928	17,833
6	20	16	...	...	...	2	103
...	2,223	26	2,320
...
1,00,800	1,000	5,400	35,370	62,858	20,377	600	2,33,789	9,601 +500 c.c.	12,85,401 +500 c.c.

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